

06512 SOV/ 141-58-1-2/14

AUTHOR: Myshkin, V. G.

TITLE: Electrodynamic Theory of the Cylindrical Luneberg Lenses

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1958, Nr 1, pp 14-19 (USSR)

ABSTRACT: The problem of the Luneberg antenna is solved by determining the field produced by the electrical current, having a given amplitude $j(r)$ in a medium having a permittivity $\epsilon(r)$ which is a function of the coordinates. For the purpose of analysis it is assumed that the permittivity is a function of the coordinate r while the current vector $\vec{j}$ has only one component, i.e. the z -component. Furthermore, j is independent of the coordinate z . In this case the vector-potential has only a z -component which is also independent of z . The vector potential satisfies the equation:

$$\frac{1}{r} \frac{\partial}{\partial r} \left(r \frac{\partial A}{\partial r} \right) + \frac{1}{r^2} \frac{\partial^2 A}{\partial \phi^2} + k^2 \epsilon(r) A = - \frac{4\pi}{c} j \quad (7)$$

For a modified Luneberg lens, whose permittivity is expressed by Eqs (4) and the current by Eq (5), the amplitudes of the vector potential are given by Eq (7). The eigenfunctions of

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the equations can be found by solving Eqs (8) or (9) which

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Electrodynamic Theory of the Cylindrical Luneberg Lenses

are obtained from Eq (7) by adopting the notation defined by Eq (10). Further, if a notation of Eqs (11) and (12) is introduced, Eq (8) can be represented as Eq (14). The solution of this is in the form of Eq (18) so that the general solution of Eq (8) is in the form of Eq (19), where C_1 and C_2 are arbitrary constants. The general solution of Eq (7) is therefore in the form of Eq (23), where $W_m(\xi)$ is the Wronskian of the fundamental solutions given by Eqs (20). The amplitudes inside the lens are therefore expressed by Eqs (25) and (26), where M is defined by Eq (27). The amplitudes for the region of $\rho > 1$ are given by Eq (28). The time constants of Eqs (25), (26) and (28) are defined by Eqs (29). In the case of a standard Luneberg lens the vector potential components are given by Eqs (32), whose constants are defined by Eqs (33). The electric field can now easily be evaluated and is given by Eqs (35) and (36). The degenerate hypergeometric functions in Eqs (35), (36) and (34) have not been properly tabulated but in most practical cases the calculations

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MYSHKIN, V.G.

Dependence of dielectric permeability of foam dielectrics on
their density. Izv. vys. ucheb. zav.; fiz. no.3:158-159 '58.
(MIRA 11:9)

1. Sibirskiy fiziko-tekhnicheskii institut pri Tomskom gosuni-
versitete imeni V.V. Kuybysheva.
(Plastics--Electric properties) (Dielectrics)

S/058/62/000/008/101/134
A160/A101

AUTHOR: Myshkin, V. G.

TITLE: Integral equations of the electromagnetic field above heterogeneous impedance surfaces

PERIODICAL: Referativnyy zhurnal, Fizika, no. 8, 1962, 15, abstract 8Zh109
("Tr. Sibirsk. fiz. tekhn. in-ta pri Tomskom un-te", no. 39, 1960, 77 - 80)

TEXT: With the help of Green's theorem, integral equations were derived for the magnetic field intensity above an infinite plane with a heterogeneous impedance, excited by a flux of magnetic current. Only TM-waves are investigated. Used as Green's function in one case is the solution of the wave equation with Neumann's boundary condition, and in the other - with the impedance boundary condition.

[Abstracter's note: Complete translation]

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MYSHKIN, V.G., inzh.

SMK-7 truck crane. Stroi. i dor. mash. 7 no.3:12-15 M '62.
(MIRA 15:4)

(Cranes, derricks, etc.)

S/141/63/006/001/007/018
E192/E382

AUTHOR:

Myshkin, V.G.

TITLE:

Investigation of the properties of surface-wave fields
above an anisotropic impedance plane

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika,
v. 6, no. 1, 1963, 74 - 84

TEXT:

The electromagnetic field above an anisotropic
impedance plane can be in the form of a superposition of TE- and
TM-fields described by means of an electric Hertz vector Π^e or
magnetic vector Π^m , directed along the axis x_2 :

$$\Pi^e = \hat{x}_2 \Pi^e, \quad \Pi^m = \hat{x}_2 \Pi^m \quad (4)$$

The functions $\Pi^e = \Pi^e(x_1, x_3)$ and $\Pi^m = \Pi^m(x_1, x_3)$ are
independent of the coordinate x_2 and are in the form:

$$\Pi^e = A e^{i(\kappa x_1 + \gamma x_3)}, \quad \Pi^m = A_m e^{i(\kappa x_1 + \gamma x_3)} \quad (5)$$

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Investigation of

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where γ is a certain unknown propagation constant along the axis x_3 , $\kappa = (k^2 - \gamma^2)^{1/2}$, A_e and A_m are arbitrary constants. Now, the electromagnetic wave in a semispace $x_1 \geq 0$, bounded by an anisotropic impedance plane $x_1 = 0$, should satisfy on this plane the following boundary condition:

$$\underline{E}_\tau = \underline{z} [\hat{x}_1 \underline{H}_\tau] \quad (1)$$

where $\underline{E}_\tau$ and $\underline{H}_\tau$ are tangential components of the field vectors and $\hat{x}_1$ is a unit vector. As regards the tensor $\underline{z}$ of the surface impedance, this is symmetrical and its components p , q and r are complex and different from zero. The magnitude of these components depends on the angle ϑ between the phase-velocity vector which coincides with the axis x_3 and a certain direction related to the impedance plane. By combining Eqs. (1) with (4) and (5), the following scattering equation is obtained:

$$D(\kappa) = (\kappa + \kappa p)(\kappa + \kappa q) - \kappa r^2 = 0 \quad (6)$$

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B192/E382

Investigation of

The amplitudes of TE- and TM-waves are given by:

$$A_0 = aA_m, \quad a = \frac{kr}{k + \kappa p}, \quad r \neq 0 \quad (7)$$

It is seen from Eq. (6) that κ can have two different values. This indicates that two different waves propagating along the axis x_3 with different phase-velocities can exist above the anisotropic plane. The problem of excitation of the wave in the semispace $x_1 \geq 0$, bounded by the impedance plane $x_1 = 0$, can be solved by determining the electric and magnetic Green tensors for the semispace. The integral representation obtained from the two-dimensional variant of the Lorentz lemma is used for solving this problem. The possibility of the existence of two surface waves with different phase-velocities and energy-density vectors not coinciding with the phase normally resembles the situation encountered in electrodynamics and optics of anisotropic media. The surface field above the anisotropic plane, excited by an incident wave, consists of two waves which are characteristic for this plane. This effect is

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S/141/63/006/001/007/018
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Investigation of

analogous to double refraction in the optics of anisotropic media.
There are 2 figures.

ASSOCIATION;

Sibirskiy fiziko-tekhnicheskiy nauchno-
issledovatel'skiy institut (Siberian Physico-
technical Scientific Research Institute)

SUBMITTED:

April 19, 1962

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MYSHKIN, V.G., inzh.

K-63 truck crane. Stroil. 1 dor. mash. 8 no.1:8-12 Ja '63.
(MIRA 18:5)

L 22872-65 EEC(b)-2/EWT(1)/EEC(t)

ACCESSION NR: AP5002318

S/0141/64/007/005/0872/0877

AUTHOR: Myshkin, V. G.

TITLE: Diffraction of normally incident surface TM waves by the boundary between isotropic and anisotropic impedance half-planes 71

SOURCE: IVUZ. Radiofizika, v. 7, no. 5, 1964, 872-877

TOPIC TAGS: electromagnetic wave diffraction, surface wave, transverse magnetic wave, impedance plane

ABSTRACT: With an aim at clarifying the characteristic features of the electrodynamic properties of systems bounded by impedance planes, the author uses expressions derived in an earlier paper (Izv. vyssh. uch. zav. -- Radiofizika v. 6, 74, 1963) for the two-dimensional Green's tensors for an anisotropic impedance plane with symmetrical surface-impedance conductivity, to solve in the Kirchhoff approximation the problem of the diffraction of a surface TM wave on the boundary between an isotropic and anisotropic impedance plane. The resultant general formulas are used to calculate the diffraction in the case when the anisotropic

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L 22872-65

ACCESSION NR: AP5002318

half-plane is a metallic ribbed structure with the ribs oriented at arbitrary angle to the separation boundary. Ways of estimating the accuracy of the results are indicated. Orig. art. has: 5 figures and 14 formulas.

ASSOCIATION: Sibirskiy fiziko-tehnicheskii institut (Siberian Physicotechnical Institute)

SUBMITTED: 07Mar63

ENCL: 00

SUB CODE: EC, EM

NR REF SOV: 002

OTHER: 001

Card 2/2

L 22871-65 EEC(b)-2/EWT(1)/EEC(t)
ACCESSION NR: AP5002319

8/0141/64/007/005/0878/0886

AUTHOR: Myshkin, V. G.

TITLE: Three-dimensional Green's tensor for an anisotropic impedance plane, and diffraction of obliquely incident surface TM wave on the boundary between an isotropic and anisotropic half-plane

SOURCE: IVUZ, Radiofizika, v. 7, no. 5, 1964, 878-886

TOPIC TAGS: Green tensor, impedance plane, electromagnetic wave diffraction, surface wave, transverse magnetic wave

ABSTRACT: This is a continuation of a companion paper in the same issue (Izv. vyssh. uch. zav. -- Radiofizika v. 7, 872, 1964; Accession Nr. AP5002318), the results of which are extended to three-dimensional calculations. In particular, the expressions from the first paper are used in conjunction with integral relations derived from the Lorentz lemma to determine the diffraction of a surface TM wave on the boundary between isotropic and anisotropic impedance planes, with the wave having an oblique incidence on the boundary. This yields in simplest

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ACCESSION NR: AP5002319

form the double refraction of the surface waves on the boundary. The general expressions obtained are used to calculate the particular case when one of the half-planes is a metallic ribbed slow-wave structure with ribs making an arbitrary angle to the separation boundary. The laws governing the refraction and total reflection of the surface waves are derived. Although the method is approximate, the conclusions pertaining to the geometry of the surface-wave refraction are rigorous. Orig. art. has: 4 figures and 22 formulas.

ASSOCIATION: Sibirskiy fiziko-tekhnicheskij institute (Siberian Physicotechnical Institute)

SUBMITTED: 07Mar63

ENCL: 00

SUB CODE: EC, EM

NR REF SOV: 002

OTHER: 000

Card 2/2

BOEROVNIKOV, M.S.; MYSHKIN, V.G.; STAROVOYTOVA, R.P.

Problem concerning the excitation of a dihedral right angle with
impedance edges. Radiotekh. i elektron. 8 no.10:1791-1793 0
'63. (MIRA 16:10)

MYSHKIN, V.G.

Diffraction of a normally incident surface TM-wave at the interface between isotropic and anisotropic impedance half-planes. Izv. vys. ucheb. zav.; radiofiz. 7 no. 6:872-877 1964. (MIRA 18:2)

1. Sibirskiy fiziko-tekhnicheskii institut.

MYSHKIN, V.G.

Three-dimensional Green's tensors for an anisotropic impedance plane,
and the diffraction of an inclined surface TM-wave at the interface
between isotropic and anisotropic half-planes. Izv. vys. ucheb. zav.;
radiofiz. 7 no.5:878-886 '64. (MIRA 18:2)

1. Sibirskiy fiziko-tekhnicheskii institut.

BOBROVNIKOV, M.S.; PONOMAREVA, V.N.; MYSHKIN, V.G.; STAROVOYTOVA, R.F.

Diffraction of a surface wave incident at an arbitrary angle
on the bend of an impedance strip. Izv. vys. ucheb. zav., fiz.
8 no.1:162-169 '65. (MIRA 18:3)

1. Sibirskiy fiziko-tekhnicheskiy institut pri Tomskom
gosudarstvennom universitete imeni Kuybysheva.

MYSHKIN, V.I.

Denumerable Abelian groups of rank 1. Dop. AN URSS no. 8:974-976
'65. (MIRA 18:8)

1. Sevastopol'skiy priborostroitel'nyy institut.

MYSHKIN, V.I.

A class of nondecomposable mixed Abelian groups. Dop. AN URSR no. 12:
1572-1574 '64. (MIRA 18:1)

1. Komunarskiy gorno-metallurgicheskiy institut. Predstavleno akademikom
V.M.Glushkovym [Glushkov, V.M.].

AMBARTSUMYAN, R.S.; KISELEV, A.A.; TSUPRUN, L.I.; GREGORNIKOV, R.V.; MYSHKIN, V.I.;
and NIKULINA, A.V.

"Mechanical Properties and Corrosion Resistance of Zirconium
and Its Alloys in Water, Steam, and Gases at High Temperatures."

report presented at the Int'l Conference on the Peaceful Uses of Atomic Energy, 2nd, Geneva,
1-13 Sept 1958.

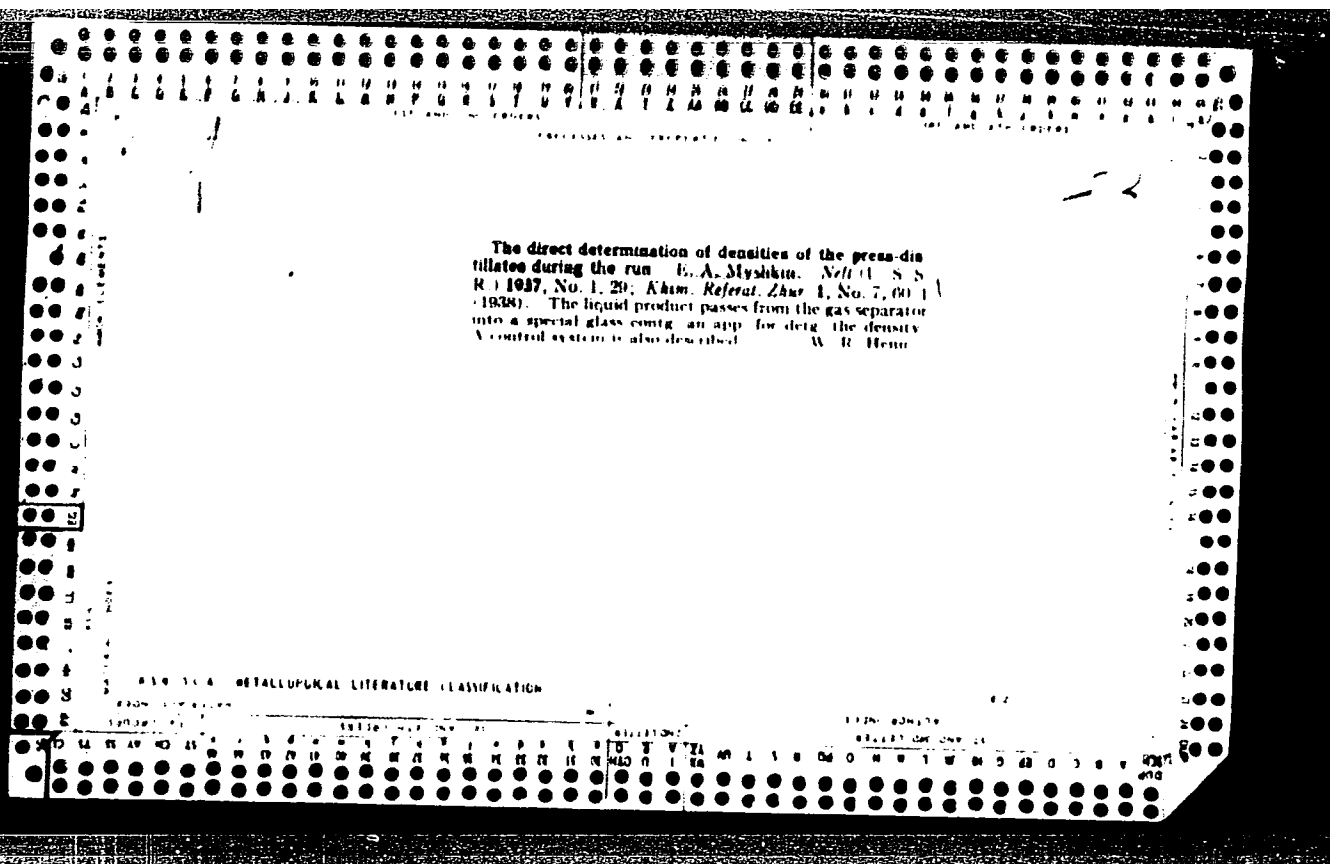
MYSHKIN, V.I. (Kommunarsk)

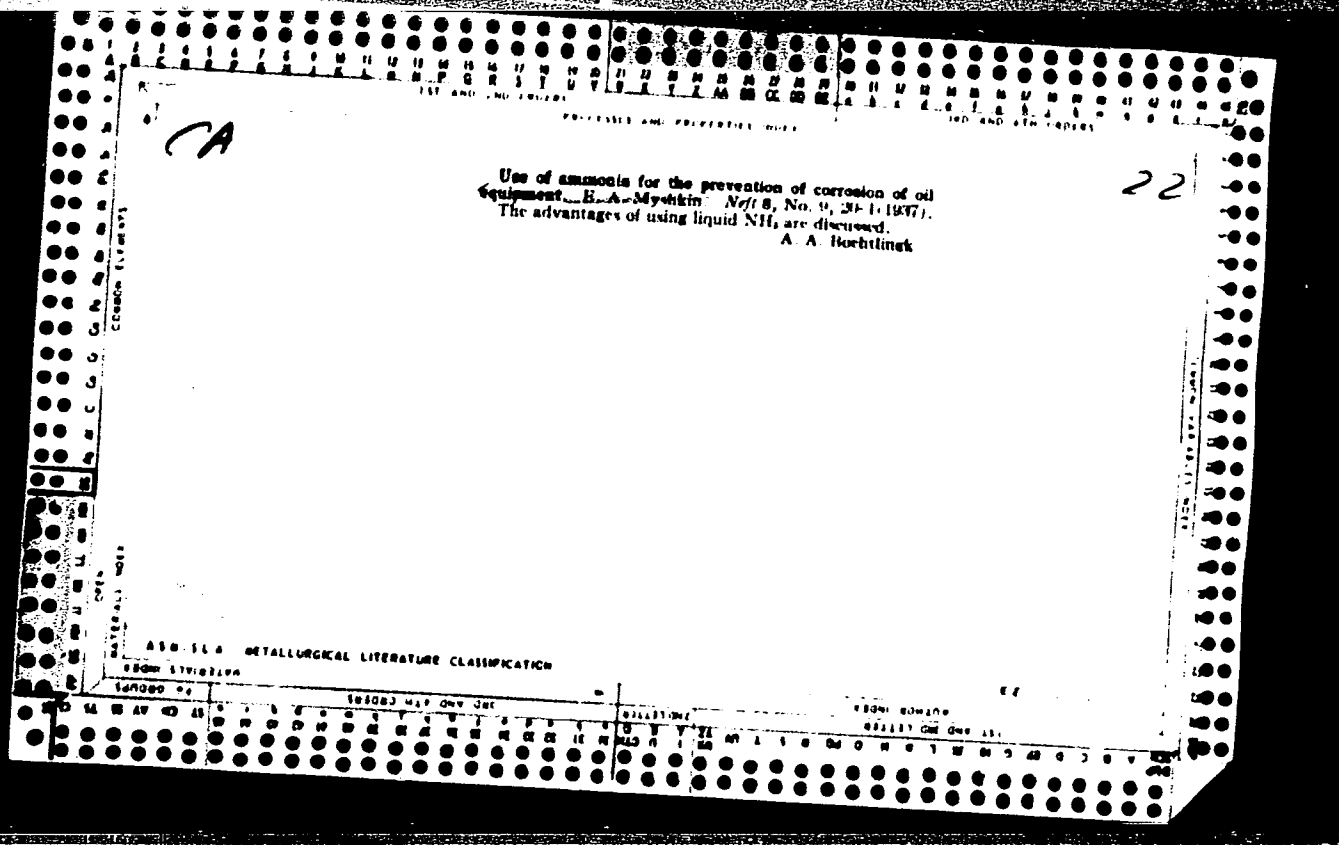
Homogeneous separable torsionless groups. Mat. sbor. 64
no.1:3-9 My '64. (MIRA 17:6)

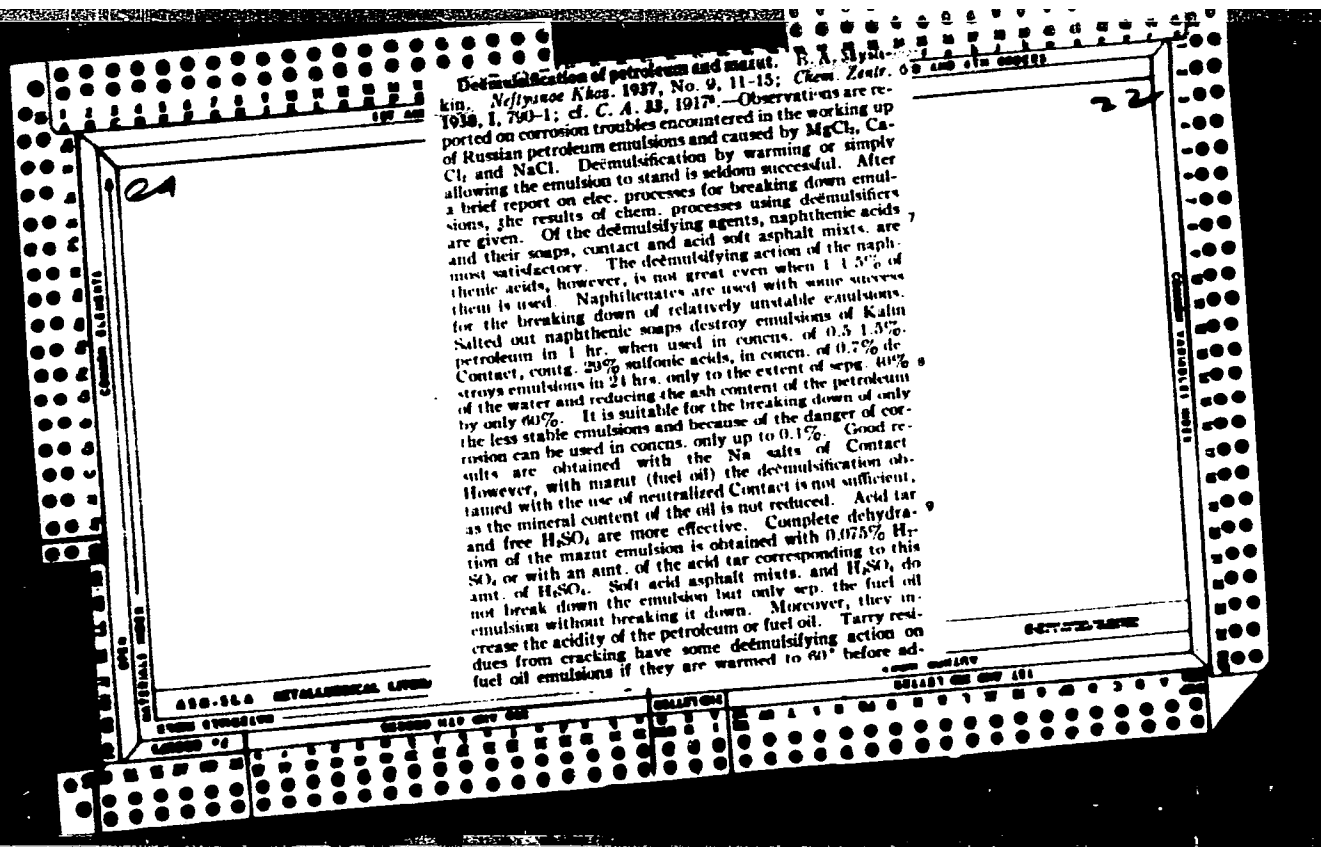
MYSHKIN, V.S., student; TSFAS, B.S., dotsent, nauchnyy rukovoditel'
raboty

Determining the quality of the balancing of the rotor and
flywheel of the synchronous motor of a two-stage refrigerating
compressor. Sbor.dokl.Stud. nauch.ob-va Fak.mekh.sel'. Kuib.
sel'khoz.inst.no.1:48-50 '62. (MIRA 17:5)

1. Kuybyshevskiy sel'skokhozyaystvennyy institut.







12

Neutralization of crude oil with electrolytes. H. A. Myshkin. *Neftyanoe Khim.* 1938, No. 6, 23-4; cf. *C. A.* 33: 8192^b. — Crude oil emulsions may be completely broken up in the cold or with slight heating by injecting into the pipe lines carrying emulsified oil a mixt. of emulsion-free crude oil and electrolytes (compn. not disclosed). A. A. Buzhiling

ASS-61A METALLURGICAL LITERATURE CLASSIFICATION

FROM SOURCE

REPLAST ONE ONLY 181

72

CA

Health hazards in the treatment of crude oils containing sulfur. H. A. Mykhlin. *Neft* 9, No. 3, 21-2(1934).-- Various instructions to protect operators, such as arrangement of air circulation and the mech. equipment needed for that purpose. A A Boshlilingh

ASS-5LA METALLURGICAL LITERATURE CLASSIFICATION

FROM BOMBAY
GILBERT ONE ONE 251

13

Breaking emulsions of oil, etc. E. A. Myshkin.
Russ. 50,032, Feb. 28, 1941. The hydrophobic emulsions
are mixed with Fe or Al salts of org. acids, e.g., naphthenic,
sulfonaphthenic, oleic or acetic acids.

MYSHKIN, Ye. A.

"Preparing Crude Petroleum and Black Oil for
Processing," Moscow, 1946.

USSR/Petroleum
Petroleum Processing
Crude Oil

Jul 48

"De-emulsification of Kobayty Petroleum,"
Ye. A. Myshkin, 3 1/2 pp

"Neft Khoz" No 7

Kobayty oil classified in heavy, tarry, and
sulfurous categories. It has specific gravity
0.940, viscosity $\eta_{50} = 240$ (6% water content).
Discusses problem of removing water from
stable emulsion (average content 35%) which
results from mixture of gas, water and oil
after deep pumps draw the crude out. Usual
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USSR/Petroleum (Contd) Jul 48

de-emulsifiers failed to separate water;
shows laboratory test results for various
others tried (alkaline residue from
dealuminized oil, aluminum sulfate, and others).
Most effective method comprised a separating
tank in an arrangement having several ad-
vantages over other methods (better de-
emulsification control, etc.)

59/49T100

PA 59/49T100

MYSHKIN, YE. A.

MYSHKIN, Ye.A.

Improving quality of petroleum catalysts. Khim.i tekhn.topl.i masel
3 no.10:56-60 0 '58. (MIRA 11:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut neftyanoy
promyshlennosti.
(Surface-active agents) (Sulfonic acids) (Petroleum products)

MYSHKIN, Ye.A., kand.tekhn.nauk

Production of compounded surface active agents. Khim.prom.
no.8:535-537 Ag '61. (MIRA 14:8)
(Surface active agents)

MYSHKIN, Ye.A.; LAVROVA, N.N.; IVANOVA, Z.M.

Complete analysis of petroleum sulfonic acids and Petrov's
contacts. Zav.lab. 27 no.2:163-164 '61. (MIRA 14:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke
nefti i gaza.

(Sulfonic acids) (Sulfuric acids)

MYSHKIN, Ye.A.

Dehydrating of fuel oils. Neft. khoz. 39 no.5:60-61 My '61.
(MIRA 14:9)
(Petroleum as fuel)

MYSHKIN, Ye.A., kand.tekhn.nauk

Production of blended dispersing agents. Khim.prom. no.4:250-253
Ap '62. (MIRA 15:5)

(Emulsifying agents)

MYSHKIN, Ye.A.

Lowering of the structural viscosity of petroleum and tarry
petroleum products. Neft. khoz. 40 no.4:52-55 Ap '61. (MIR 1961)
(Petroleum products)
(Viscosity)

MYSHKIN, Ye.A.

Obtaining sulfonates with high surface activity. Neftaper i reftekhim
no.3:27-29 '55. (MIRA 13:5)

1. Mosneftegaz.

MYSHKIN, Ye. P.

Myshkin, Ye. P. - "A political map of the world", Sbornik nauch.-tekhn. i priozvod. statey po geodizii, kartografii, topografii, aers"yemke i pravimetrii, issue 21, 1943, p. 89-94. Assuring the early fulfillment of the Five-Year Plan in geodesy and cartography", (Editorial), Sbornik nauch.-tekhn. i priozvod. statey po geodezii, karto-rafii, topo-rafii, aers"yemke i pravimetrii, issue 21, 1943, p. 5-11.

SO: U-4110, 17 July 53, (Letopis 'Zhurnal 'nykh Statey, No. 19, 1949).

2

S/136/60/000/04/013/025
E091/E235

AUTHORS: Tsenter, Ya. A., Gvozdev, S. G., Orobey, N. Ya.,
Myshkina, A. D., Andreyev, A. Ye., and Mal'shin, V. M

TITLE: Improving the Grade of Commercial Primary Magnesium and
Magnesium Alloys ✓

PERIODICAL: Tsvetnyye metally, 1960, Nr 4, pp 51-56 (USSR)

ABSTRACT: The results are described of laboratory and production tests aimed at producing a commercial metal which satisfies the exacting requirements with respect to flux inclusions. The following operations were carried out: a) testing of various chloride and chloride-free fluxes under melting and pouring conditions of magnesium and its alloys; b) introduction of conveyor teeming of ingot moulds in place of hand teeming; c) complete revision of the melting and teeming procedure for primary magnesium and the magnesium alloys MGS1 and MGS5. ✓ Experimental melting of magnesium and MGS5 alloys with various fluxes were carried out under laboratory conditions (see Table, p 52). All fluxes were applied as cover layers, except for the VIZ flux, which was applied the same way as a refining flux. The starting metal for the experimental melting was standard magnesium produced by the Berezniki Magnesium ✓

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Works (BMZ) and an MGS5 alloy manufactured by the Solikamsk Magnesium Works (SMZ). In the case of some melts, 3% electrolyte was added to the molten metal in order to bring up the chloride content of the metal to that of the crude magnesium. In a few melts, solid crude magnesium, made at the VAMI experimental establishment, was used. Melting of 8.5 to 9 kg of metal was carried out in an iron crucible in an electric resistance furnace, using magnesium or MGS5 alloy ingots as the initial charge. The metal was melted under a layer of flux and heated to the teeming temperature. When solid crude magnesium, and MGS5 alloy made from it, were used, the metal was melted under a layer of flux and heated to 710 to 720°C. The melt was refined at this temperature with VIZ flux and then cooled to the teeming temperature. In some melts, the metal was reheated to 800°C after refining and allowed to stand until its temperature had dropped to that at which teeming could be carried out. In all cases the teeming temperature of magnesium was 690 to 700°C and

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that of the MGS5 alloy, 680 to 690°C. The metal was poured directly from the tilting crucible into horizontal ingot moulds. From each melt, 3 ingots were teemed, each weighing 2.5 to 3 kg. During teeming, the jet and the metal in the moulds were protected by sulphur powder. A comparative estimate was carried out on the basis of the ability of a flux to protect the metal from burning, on its ability to form a plastic crust at the end of the melt, on the ability to separate from the metal on teeming, etc. Three melts were made with each flux. On the basis of observations carried out during melting, the following can be said; a) all established chloride fluxes protect the metal satisfactorily against burning; b) the chloride-free fluxes VAMI-1 and VAMI-5 and borate flux barely protect the metal from burning and can be applied as cover fluxes only for a relatively short period; c) addition of boric acid to VIZ flux prior to teeming leads to the formation of a stronger and more tenacious flux crust to form and enables it to separate more easily

Card 3/4 from the metal. This lessens the possibility of flux

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Improving the Grade of Commercial Primary Magnesium and Magnesium Alloys

entering the metal. The quality of the metal was estimated according to its chloride content and by results of inspections of fractures and cuttings of ingots, i.e. by standard control methods. To expose flux inclusions, specimens were tested in a steam-air chamber. On the basis of laboratory and industrial test results, changes were incorporated in the technological procedure in the manufacture of commercial magnesium and the magnesium alloys MGS-1 and MGS-5. The work described in this paper was carried out by VAMI the Berezniki Branch of VAMI jointly with the Berezniki and the Solikamsk Magnesium Works. There are 1 table and 3 references, 2 of which are Soviet and 1 English.



Card 4/4

SAFONOVA, T.S.; MYSHKINA, L.A.

Preparation of esters of orotylamino acids and salts of orotic acid with amino compounds. Zhur. ob.khim. 34 no. 5:1682
My '64. (MIRA 17:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy khimiko-farmatsevticheskiy institut imeni Ordzhonikidze.

SAFONOVA, T.S.; SERGIYEVSKIY, S.I.; MYSHKINA, L.A.

N-bis(β -chloroethyl)amides of amino acids. Part 5: Rearrangement of N-bis(β -chloroethyl)amides of N'-phthaloylalanines to β -chloroethylaminoethyl esters of N-phthaloylalanines. Zhur. org. khim. 1 no.4:791-796 Ap '65. (MIRA 18:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy khimiko-farmatsevticheskiy institut imeni Ordzhonikidze.

NIKITINA, T.F.; MYSHKINA, L.P.

Root knot nematodes and measures for combating them. Trudy probl.
i tem.soveshch. no.3:118-123 '54. (MIRA 8:5)

1. Gor'kovskiy sel'skokhozyaystvennyy institut.
(Root knot)

MYSHKINA, L. P. Cand Biol Sci -- (diss) "Nematod^a and ~~HELMINTH~~
vegetable plants of
Nematodoses of the Principal ~~Fruit Growths in~~ Gor'kovskaya Oblast."
Gor'kiy, 1956. 12 pp & 20 cm. (All-Union Inst of Helminthology
im Academician K. I. Skryabin, Gor'kiy State Pedagogical Inst,
Chair of Zoology), 100 copies (KL, 27-57, 106)

- 20 -

USSR/Zooparasitology - Helminths.

G-2

Abs Jour : Ref Zhur - Biol., No 10, 1958, 43397

Author : Myshkina, L.P.

Inst : -

Title : Potato Nematodes in the Gorkov Region.

Orig Pub : Uch. zap. Gorkovsk. gos. ped. in-t, 1957, 19, 93-100.

Abstract : In analyzing potato leaves and stems, roots and tubers from the fields and from vegetable storage houses, 10 species of nematodes (*Pratylenchus pratensis*, *Aphelenchus avenae*, *Aphelenchoides parietinus*, *Aphelenchoides dermati*, *Hexatylus viviparus*, *Meloidogyne marioni*, *Pratylenchus macrophallus*, *Paraphelenchus pseudoparietinus*, *Rotylenchus multicinctus*, *Ditylenchus intermedius*) and 25 saprozoic species were identified.

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MYSHKINA, L.P., kand.biologicheskikh nauk

Studying nematodes of weeds in Gorkiy Province. Uch.zap.GGPI
no.27:153-159 '60. (MIRA 15:3)
(Gorkiy Province—Nematode diseases of plants) (Weeds)

MYSHKINA, M. I.

USSR/Miscellaneous

Card 1/1

Author : Rosen'berg, I. L., engineer

Title : Review of handbook on metallurgy and thermo treatment

Periodical : Vest. mash. 34/3, 102-105, Mar/1954

Abstract : Metallurgy and Thermo Treatment, Bibliographical Handbook (1860-1947). This book was compiled by M. I. Myshkina and M. A. Raevskaya under the direction and scientific editorship of I. S. Kozlovskiy, Cand. in Tech. Sciences; Mashgiz, M. 1952, 614 pages. The book has two volumes and four sections. The literature referred to is classified according to subject. The reviewer finds many errors in such classification.

Institution :

Submitted :

~~MYSHKINA, M.I.~~, bibliograf; LOBANOVA, K.M., bibliograf; RUDAKOVA, V.I.,
bibliograf; GORDON, L.L., bibliograf; SOKOLOV, N.V., prof.,
nauchnyy red. [deceased]; BARBASHIN, N.N., kand.tekhn.nauk, red.;
MODEL', B.I., tekhn.red.

[Founding; a bibliography of the literature published before
1955] Liteinoe proizvodstvo; bibliograficheskii ukazatel' lite-
ratury po 1955 g. Red. N.V.Sokolova. Moskva, Gos.nauchno-tekhn.
izd-vo mashinostroit.lit-ry, 1959. 687 p. (MIRA 12:7)
(Bibliography--Founding)

AA 1011111, N 1

TROYANOV, I.A.; BEKHER, R.M.; KRAYUKHINA, N.N.; SHEYN, I.A.; MYSHKINA, N.P.

Sorption removal of organic substances from waste waters. Khim.
nauka i prom. 2 no.5:672 '57. (MIRA 10:12)

1. Rubezhanskiy filial nauchno-issledovatel'skogo instituta
poluproduktov i krasiteley.

(Sewage--Purification)
(Sorption)

BEKHET, R.M.; MYSHKINA, N.P.

Regenerative purification of waste waters containing n-nitrophenol. Ukr. khim. zhur. 26 no.2:270-272 '60.
(MIRA 13:9)

1. Nauchno-issledovatel'skiy institut organicheskikh poluproduktov i krasiteley im. K.Ye. Voroshilova, filial v g. Rubezhnom.
(Phenol) (Salvage (Waste, etc.))

BEKHER, P.M.; KOGANOVSKIY, A.M.; KRAYUKHINA, N.N.; MYSHKINA, N.P.; TARAN,
P.M.; TROYANOV, I.A.; SHEYN, S.M.

Adsorption removal of aromatic compounds from the waste waters of
aniline dye production. Ukr. khim. zhur. 27 no.2:268-273 '61.
(MIRA 14:3)

1. Institut obshchey i neorganicheskoy khimii AN USSR i Rube-
zhanskiy filial Nauchno-issledovatel'skogo instituta organi-
cheskikh poluproduktov i krasiteley.
(Salvage(Waste, etc.))
(Aromatic compounds)

MYSHKINA, N.V.

MYSHKINA, N.V. "Surface Anastomoses of the Coronary Arteries of the heart of Man and Certain Vertebrates." Min Health USSR. Kuytyshev State Medical Inst. Chair of Normal Anatomy. Kuytyshev, 1956. (Dissertation for the Degree of Candidate in Biological Science)

So: Knizhnaya Letopis', No. 18, 1956,

L 22593-65 EWT(m)/EWP(e)/EWP(t)/EWP(k)/EWP(b) Pf-4 JD

ACCESSION NR: AP5004435

S/0226/65/000/001/0001/0012

AUTHOR: Kumin, N. F. (Moscow); Yurchenko, B. D. (Moscow); Myshkina, N. V. (Moscow) B

TITLE: Phenomena of energy absorption during compacting of metal powder 1

SOURCE: Poroshkovaya metallurgiya, no. 1, 1965, 1-12

TOPIC TAGS: copper, iron, aluminum, zinc, monolithic metal, relative absorption, heat generation, resoftening

ABSTRACT: The phenomenon of energy absorption during pressing of powders was studied. The maximum value of the specific absorption of energy proved to be 0.59 for copper, 0.80 for iron, 1.30 for aluminum, 0.595 for zinc and 0.14 cal/g for tin. The absorption of energy during compacting of powders is effected the same way as during deformation of monolithic metals. The relative absorption dw/da at various stages of pressing first increases, reaches a maximum and then falls and becomes negative at various degrees of compactness. In the region of negative values of the function dw/da the generation of heat at a given stage is greater than the work of deformation. This means that in this region of pressing

Card 1/2

L 22593-65

ACCESSION NR: AP5004435

the material begins to be resoftened. This resoftening may depend on the decrease in the potential barrier for atoms under the effect of the applied tension or on the cracking of the pressing. Orig. art. has: 6 formulas and 10 figures.

ASSOCIATION: none

SUBMITTED: 06Nov63

ENCL: 00

SUB CODE: ME, MM

NO REF SOV: 003

OTHER: 000

Card 2/2

L 21300-66 EWP(e)/EWT(m)/EWP(t)/EWP(k) JD

ACC NR: AP6007283

SOURCE CODE: UR/0226/66/000/002/0021/0026

AUTHOR: Kunin, N. F.; Yurchenko, B. D.; Myshkina, N. V.

ORG: Belorussian State University im. V. I. Lenin (Belorusskiy gosuniversitet)

TITLE: Absorption of energy in pressing powder mixtures, 6

SOURCE: Poroshkovaya metallurgiya, no. 2, 1966, 21-26

TOPIC TAGS: energy absorption, solid solution, powder metal, zinc, copper, tin

ABSTRACT: The authors measured the energy absorption in powder mixtures of Cu+Zn and Cu+Sn. The value of the specific energy absorbed increases with compactness, reaches a maximum and then falls. The differential relative absorption varies in the same way. With high compactness the latter value is negative. The maximum specific absorption of energy for mixtures is lower than that for powders made of pure metals. Reduction of absorption is explained by the formation of surface solid solutions in contact regions. The thickness of the films of surface solid solutions, calculated from the reduction absorption and the constants of formation of solid solutions for a 60 to 40 mixture proved to be of the order of one hundredth of a centimeter. Orig. art. has: 6 figures, 2 tables and 4 formulas. [Author's abstract.]

SUB CODE: 11/ SUBM DATE: 25Feb65/ ORIG REF: 005/

Card 1/1

MYSHKINA, O.K.

Treatment of epidemic hepatitis (Botkin's disease) with dextramycin. Antibiotiki 5 no.6:99-103 N-D '60. (MIRA 14:3)

1. Kafedra infeksionnykh bolezney (zav. V.I.Rabinovich) i kafedra propedevniki vnutrennikh bolezney (zav. - prof.A.I.Levin) Permskogo meditsinskogo instituta.
(CHLOROMYCETIN) (HEPATITIS, INFECTIOUS)

MYSHKINA, O.K.

Functional state of the adrenal cortex in Botkin's disease. Kaz.
med. zhur. no.5:42-43 S-0'63 (MIRA 16:12)

1. Kafedra infektsionnykh bolezney (zav. - dotsent V.I.Rabinovich)
i kafedra propedevtiki vnutrennikh bolezney (zav. - prof. A.I.
Levin) Permskogo meditsinskogo instituta.

YEPIFANOV, N.S.; MYSHKINA, P.S. (Kirov)

Surgical care of workers in logging industries. Zdrav.Ros.Fed. 3
no.10:30-32 0 '59. (MIRA 13:1)
(KIROV PROVINCE--LUMBERMEN--MEDICAL CARE)

MYSHKIS, A. D.

"On the Existence of the Total Differential on the Boundary of a Plane Domain," Dokl. AN SSSR, 48, No.2, 1945

Zhukovskiy Air Engineering Acad., Moscow

YSHKIS, A.D.

O sushchestvovanii polnogo differentsial na granitse ploskoy oblasti. IAN, ser.
matem., 10 (1946), 359-392.
Obobshcheniye pervoy teoremy Lyapunova o neustoychivosti na sluchay, zavisyashchiy
ot vremeni chasti okrestnosti nevozmozhnostennogo sostoya
Zum dynamischen Wärmeleitungs problem. Math. Z., 38 (1934), 323-337.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A.G.,
Markushevich, A.I.,
Rashevskiy, P.K.
Moscow-Leningrad, 1948

Myshkis, A.

Myshkis, A. Sur un lemme géométrique qui s'applique aux trajectoires de stabilité au sens de Liapounov. C. R. Acad. Sci. URSS (N.S.) 55, 295-298 (1947). (Doklady Akad. Sci. URSS (N.S.) 55, 295-298 (1947).) Let G be a domain in the $(n+1)$ -dimensional space of real variables $x_1, \dots, x_n, t$. Let S be an $(n-1)$ -dimensional closed manifold in the subspace $t=0$, such that the family of coordinates is contained inside S . Consider a family of (mutually disjoint) trajectories $T(A, t)$ ($0 \leq t < \infty$, $A \in S \cap G$), where $T(A, 0) = A$, $T(A, t) \neq (0, \dots, 0, t)$. E_{n+1} denotes the subspace of E_{n+1} corresponding to a fixed value of t . It is assumed that $T(A, t)$ is a continuous function in the arguments A, t . The author states conditions on the domain G and the function $T(A, t)$ which guarantee the existence of a point $A \in S \cap G$, such that $T(A, t) \in G$ for all $t \in [0, \infty)$. It seems to the reviewer that, contrary to the statement by the author, the continuity of $T(A, t)$ should be required only for pairs (A, t) such that $T(A, t) \in G$. Should continuity be assumed for all (A, t) , the conditions imposed on the function $T(A, t)$ would trivially imply $T(A, t) \in G$ for all pairs (A, t) . W. Hurewicz (Cambridge, Mass.)

Symon
Ritz

Source: Mathematical Reviews,

Vol 9

No. 7

MYSHKIS, A.

PA 52T40

USSR/Mathematics - Equations, Differen- Oct 1947
tial (Partial)

"A. Haar's Method in the Question Regarding the
Unique Solution of Cauchy's Problem for Systems of
Differential Equations with Partial Derivatives,"
A. Myshkis, 4 pp

"Dok Akad Nauk SSSR" Vol LVIII, No 1

Mathematical treatment of one of the conclusions re-
sulting from Haar's lemma on subject problem. Sub-
mitted by Academician I. G. Petrovskiy, 8 Jul 1947

52T40

MYSHKIS, A. D.

Myskis, A. The uniqueness of the solution of Cauchy's problem. Uspehi matemat. nauk (N.S.) 3, no. 2(24), 3-46 (1948). (Russian)

Given a system of differential equations

$$F_j(x_1, \dots, x_n, z_1, \dots, z_m, \partial z_i / \partial x_1, \dots) = 0, \quad j=1, \dots, k,$$

let G be a domain in $(x_1, \dots, x_n)$ space, Γ the boundary of G , and M a subset of Γ . The "local" Cauchy problem consists in finding (in a certain class of functions) a solution $z_1, \dots, z_m$ of (1), defined on all points of G "sufficiently near" to M , and such that for each i ($i=1, \dots, m$), the function z_i and its partial derivatives up to order l_i inclusive assume given values (called the "initial data") on M . The uniqueness problem (for the given class of functions) consists in finding conditions under which two solutions of (1), satisfying the same initial data, must coincide for all points of G sufficiently near to M . The present paper is a review of the literature on the subject, and contains many proofs and several improvements of the results available. A bibliography of sixty articles is included.

Source: Mathematical Reviews.

Section 1 deals with the period up to 1901, principal mention being made of the treatment of the "normal" case of (1) by S. Kowalevsky [J. Reine Angew. Math. 80, 1-32 (1875)]. Here

$$\partial^q z_i / \partial x_1^{q_1} \dots \partial x_n^{q_n} = f_i(x_1, \dots, x_n, z_1, \dots, z_m, \partial z_j / \partial x_1, \dots), \quad i=1, \dots, m,$$

where the functions f_i do not contain the arguments $\partial^q z_i / \partial x_1^{q_1} \dots \partial x_n^{q_n}$ for $q > p_i$ or $r \geq p_i$. Also, G is the half-space $x_1 > 0$, Γ is the plane $x_1 = 0$, and M is open in Γ ; further, $l_i = p_i - 1$ ($i=1, \dots, m$). In this connection, reference is made to the recent work of N. A. Lednev [Mat. Sbornik N.S. 22(64), 205-266 (1948); these Rev. 10, 253]. Section 2 contains a proof of Holmgren's [Ofversigt af Kongl. Svenska Vetenskaps-Akad. Förhandlingar 58, 91-103 (1901)] uniqueness theorem for linear systems of arbitrary order in any number of independent variables and with analytic coefficients, the solutions of the system being assumed to be continuous together with all the derivatives which appear in the system, and mentions Hadamard's [Leçons sur la Propagation des Ondes et les Équations de l'Hydrodynamique, Paris, 1903, note 1] remark that the uniqueness problem for nonlinear systems rests on the uniqueness

problem for linear systems, whose coefficients, however, need not be analytic even if the functions involved in the given nonlinear system are. Section 3 takes up the case of a single equation of the first order, which occupies a special place in view of its relation to certain systems of ordinary differential equations. Haar's [Atti Congresso Internaz. Mat., Bologna, 1928, v. 3, pp. 5-10 (1930)] lemma is proved and various of its consequences are presented. Section 4 treats hyperbolic equations and systems, again using Haar's lemma and Hadamard's remark. Section 5 is concerned with elliptic equations and systems. In particular, T. Carleman's [C. R. Acad. Sci. Paris 197, 471-474 (1933)] results concerning the system

$$\frac{\partial u}{\partial x} - \frac{\partial v}{\partial y} = \alpha(x, y)u + \beta(x, y)v;$$

$$\frac{\partial u}{\partial y} + \frac{\partial v}{\partial x} = \gamma(x, y)u + \delta(x, y)v;$$

are considered in detail. Section 6 discusses Carleman's [Ark. Mat. Astr. Fys. 26B, no. 17 (1939); these Rev. 1, 55] results for the normal system

Source: Mathematical Reviews,

$$\frac{\partial x_p}{\partial x} + \sum_{q=1}^n A_{pq}(x, y) \frac{\partial x_q}{\partial y} + \sum_{q=1}^n B_{pq}(x, y) x_q = 0, \quad p = 1, \dots, n.$$

Section 7 contains an example given by the author [Doklady Akad. Nauk SSSR (N.S.) 58, 21-24 (1947); these Rev. 9, 354] of the nonuniqueness of the solution of Cauchy's problem for

$$\frac{\partial u}{\partial x} = a_1(x, y) \frac{\partial u}{\partial y} + b_1(x, y) \frac{\partial v}{\partial y},$$

$$\frac{\partial v}{\partial x} = a_2(x, y) \frac{\partial u}{\partial y} + b_2(x, y) \frac{\partial v}{\partial y},$$

which shows that Haar's method used in section 3 cannot be directly carried over to deal with such a system. Section 8 considers the uniqueness of the "nonlocal" Cauchy problem, where the solutions are required to be defined on all of G . Reference is made to the author [Rec. Math. [Mat. Sbornik] N.S. 19(61), 489-522 (1946); these Rev. 8, 383] to E. John [Proc. Nat. Acad. Sci. U. S. A. 29, 98-104 (1943); these Rev. 4, 279], and to an example of T. Wazewski of an infinitely differentiable function $Q(x, y)$ defined on a simply connected domain G and such that any continuous solution in G of the equation $\partial u / \partial x + Q(x, y) \partial u / \partial y =$ constant.

Vol 10 no.

MYSHKIS, A. D.

"The Concept of Boundary," *Matemat.Sbor.*, №.3, 1949

MYSHKIS, A. D.

Myshkis, A. D. General theory of differential equations with retarded arguments. Uspehi Matem. Nauk (N.S.) 4, no. 5(33), 99-141 (1949). (Russian)

An extensive bibliography is given, as well as an outline of the past developments and of the current state of the subject. With a few notable exceptions, most of the past literature dealt with rather special problems and often formally and with inadequate rigor. The major part of this work embodies contributions by the author to the general theory. A considerable part of past study had been with respect to differential-difference equations

$$(1) \quad \sum_{i=0}^n a_i y^{(i)}(x+h_i) = 0$$

(a_i, h_i constants; h_i real). Eidel's method consists in substituting in (1) $y = e^{\lambda x}$ giving for λ a transcendental equation (2) $E(\lambda) = 0$; a formal solution of (1) is $\sum C_i e^{\lambda_i x}$ (λ_i are the roots of (2)). The author studies the equation

$$(3) \quad y^{(m)}(x) = f(x, \dots, y^{(i)}(x - \Delta_i(x)), \dots)$$

where $m > 0$ and the arguments of f are x and the displayed derivatives for $i = 0, \dots, m-1$ and $k = 1, \dots, k_i$ ($k_i \geq 0$); all the "retards" $\Delta_i(x) \geq 0$ (in physical problems, involving equation (3), there is a good reason for this). A generalization of (3) is the system

$$(4) \quad y_i^{(m_i)}(x) = f_i(x, \dots, y_j^{(i)}(x - \Delta_{ij}(x)), \dots)$$

($i = 1, \dots, n$), where $j \leq m_i$, $i \leq m_j - 1$, $k_j \geq 0$; $\Delta_{ij}(x) \geq 0$.

Source: Mathematical Reviews

Vol 11 No. 5

the author rephrases the determination of the product $(K_0/\Omega, \pi_0)$ by means of the class field theory (Artin symbol and norm residue symbol) for special ground fields; e.g., the field component of $(K_0/\Omega, \pi_0)$ is determined by the class group H_0 of fields α of Ω which are given by the requirement

$$\prod \left(\frac{K/\Omega}{\alpha} \right)^{a_i} = 1,$$

where $(\cdot)$ denotes the Artin symbol belonging to a typical field component of the algebra $(K/\Omega, \pi_0)$.

O. P. G. Schilling (Chicago, Ill.).

SM(1)

1-1/2

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Source: Mathematical Reviews,

Vol. 11 No. 5

MYSHKIS, A-D

Myshkis, A. D. On a criterion for subharmonicity. Mat. Sbornik N.S. 25(67), 315-320 (1949). (Russian)

L'auteur montre d'abord que si u est continuellement différentiable dans un domaine G , une condition nécessaire et suffisante de sousharmonicité est que l'intégrale-flux $\int (\partial u / \partial n) ds$ vers l'intérieur soit ≤ 0 pour toute surface assez régulière contenue dans G ainsi que son intérieur, propriété bien connue depuis l'introduction des fonctions sousharmoniques. L'extension en est faite aux fonctions analogues, comparées non plus aux fonctions prenant les mêmes valeurs frontière et harmoniques mais intégrales de

$$(1) \quad \sum \frac{\partial}{\partial x_i} \left(a_{ik} \frac{\partial u}{\partial x_k} \right) = 0, \quad a_{ik} = a_{ki},$$

$\sum a_{ik} x_i x_k$ étant une forme quadratique définie positive et les a_{ik} à dérivées secondes höldériennes. Le flux est remplacé par $\sum a_{ik} \cos(x_i, n) (\partial u / \partial x_k) ds$ et la condition de signe équivaut aussitôt à

$$\sum \frac{\partial}{\partial x_i} \left(u_{ik} \frac{\partial u}{\partial x_k} \right) \geq 0,$$

ce dont on voit l'équivalence avec la définition (on utilise des résultats de Giraud sur la résolution du problème de Dirichlet pour l'équation (1) et l'existence de dérivées normales de la solution à la frontière).

M. Brelot

Source: Mathematical Reviews,

Vol. 11 No. 5

MYSHKIS, A. D.

37152. K Ponyatiyu granitsy. Matem. Sbornik, novaya seriya, t. XXV Vyp. 3, 1949, s 387-414 — Bibliogr: 31 Nasv.

SO: Letopis' Zhurnal'nykh Statey, Vol 7, 1949

MYSHKIS, A.D.

✓ Myshkis, A. A theorem from the theory of dynamical systems. Moskov. Gos. Univ. Uč. Zap. 145, Mat. 3 (1945), 129-130. (Russian)

Math
In a topological space R let a continuous flow be given. Let S be the union of all trajectories contained in a given closed set F . Then each component of connectivity K of $R-S$ contains at least one component of $R-F$. In order that $K \cap (R-F)$ should contain exactly one component of $R-F$ it is necessary and sufficient that each trajectory intersect at most one component of $R-F$. For example, if u is a function of class C^1 in a domain R of n -space, if the trajectories of the system $dx_i/dt = \partial u / \partial x_i$ ($i=1, \dots, n$) lie entirely in R , if $u=0$ on the boundary of a compact set $F \subset R$, and if any two components of $R-F$ are separated by a positive distance, then the union S of the trajectories contained in F separates all the components of $R-F$ from each other.

J. C. Oxtoby (Bryn Mawr, Pa.)

Doc Physicomath Sci

MYSHKIS, A. D.

Dissertation: "Differential Equations with a Lagging Argument."
29/6/50

Moscow Order of Lenin State U imeni

M. V. Lomonosov

SO Vecheryaya Moskva
Sum 71

MYSHKIS, A. D.

158T61

USSR/Mathematics - Difference Equations Mar/Apr 50

"Additional Bibliographic Data for the Paper Entitled
'The General Theory of Differential Equations With
Lagging Arguments,'" A. D. Myshkis, 7 pp

"Uspekhi Matemat Nauk" Vol V, No 2

Additional references to differential-functional and
mixed-difference equations, such as: $y(x+a)-y(x) =$
 $by'(x)$ and $y'(x) = ky(x+a)$, etc. (3' new references,
mostly foreign).

158T61

Myškis, A. D. Linear homogeneous differential equations of the first order with retarded argument. Uspehi Matem. Nauk (N.S.) 5, no. 2(36), 160-162 (1950). (Russian)
 The author classifies the solutions of the equations $y^{(1)}(x) - M(x)y(x - \Delta(x)) = 0$, $y^{(1)}(x) + M(x)y(x - \Delta(x)) = 0$, $M(x) \geq 0$, $\Delta(x) \geq 0$, $A \leq x < B$, $-\infty < A < B \leq \infty$, essentially under the hypotheses and in the general setting of the author's work [same journal (N.S.) 4, no. 5(33), 99-141 (1949); these Rev. 11, 365]. Under suitable initial conditions (with M, Δ continuous) a unique solution $y(x)$ exists.
 W. J. Trjucinsky (Urbana, Ill.).

Source: Mathematical Reviews,

Vol 12, No. 2

SMU

MYSHKISH, A. D.

Myškis, A. D. The definition of a boundary by means of continuous mappings. Mat. Sbornik N.S. 26(68), 225-227 (1950). (Russian)
 Myškis, A. D. On the equivalence of certain methods of definition of a boundary. Mat. Sbornik N.S. 26(68), 228-236 (1950). (Russian)

The notation will be as in an earlier paper [Mat. Sbornik N.S. 25(67), 387-414 (1949); these Rev. 11, 382, cited as 1]. The notions introduced there are now specialized by the author in various ways. (a) Let $y = \phi(x)$ map continuously a topological space R onto a dense subset $\phi(R)$ of a Hausdorff space H and let $H_0 = H - \phi(R)$. Let π be the set of classes M_x of open sets U in R such that there exists a neighbourhood V of y for which $\phi^{-1}(V) \subset U$, and let π be topologized as in (1). Then π is a boundary of R in the wide sense. Sufficient conditions are given for π to be so in the narrow sense. If it is regular π is homeomorphic to H_0 . (b) Given in a space R (i) a contracting sequence $G_1, G_2, \dots$ of open sets, or (ii) a sequence $\{x_n\}$ of points, we term "associated class of open sets" the class of the open sets G in R such that $G \supset G_n$ for some n , or that $x_n \in G$ for all large n . If R is a simply-connected plane domain, the author extends the notion of a Carathéodory chain of subdomains $\{G_n\}$ to mean a contracting sequence of simply-connected subdomains whose boundaries relative to R are connected and have positive distances from one another but zero distances from the boundary of R ; he shows that this extension is immaterial to the Carathéodory notion of end, here defined as the class of open sets associated with a Carathéodory chain, and to the notion of prime end, here defined as an end not contained (as proper subclass) in any other end. If R is a domain in a finite-dimensional Euclidean space, a Perkins chain $\{G_n\}$ means a contracting sequence of open sets in R with diameters tending to zero, whose absolute boundaries meet that of R while their boundaries relative to R coincide with the boundaries relative to R of their closures and have positive distances from one another; a Mazurkiewicz sequence $\{x_n\}$ means a sequence of points of R such that $p(x_n, x_n) \rightarrow 0$ as $n, m \rightarrow \infty$, where $p(p, q)$ denotes the minimum diameter of continua in R joining the points p, q ; the author proves that classes of open sets associated with Perkins chains are identical with those associated with Mazurkiewicz sequences; the set of these classes topologized as in (1), the Perkins boundary of R , is thus equivalent to the corresponding Mazurkiewicz definition. Finally when R is a general topological space, the author compares his own definition with a descriptive boundary, also due to Mazurkiewicz [Fund. Math. 33, 177-228 (1945); these Rev. 8, 47].

L. C. Young (Madison, Wis.).

32

Source: Mathematical Reviews, 1950 Vol 11 No. 8

MYSHKIS, A-D

Myškis, A. D. On the solution of a boundary problem of potential theory with a generalization of the concept of boundary. Mat. Sbornik N.S. 26(68), 341-344 (1950). (Russian)

L'auteur étend des résultats classiques sur le problème de Dirichlet (selon Perron et Wiener) en prenant une topologie très générale qu'il a étudiée ailleurs [Mat. Sbornik N.S. 25(67), 387-414 (1949); ces Rev. 11, 382]. Il montre sur trois exemples diverses possibilités. M. Brelot.

Source: Mathematical Reviews,

Vol 12 No. 8

Sm
L222

MYSHKIS, A. D.

Myshkis, A. D. The complete differential at a generalized boundary point. Mat. Sbornik N.S. 25(69), 345-350 (1950). (Russian)

Let R be a bounded open set in Cartesian n -space E_n , let $r(x, y)$ be the ordinary distance of the points x, y and let $r^*(x, y)$ be, for x, y in R , the minimal length of arcs in R joining the points x, y . Further let $r(x, Y)$ and $r^*(x, Y)$ denote the (minimal) r and r^* distances from the point x to the point-set Y . In accordance with one of the author's earlier definitions [Mat. Sbornik N.S. 25(67), 387-414 (1949); these Rev. 11, 382], a generalized boundary point of R is a class M of nonempty open subsets G of R such that the intersection of any two members G_1, G_2 of M contains as subset a member G of M , while the intersection of all members of M is empty; M is termed "nicely approachable" in case of finiteness of the number $\inf_{G \in M} \sup_{x \in G} r^*(x)/r(x)$,

where $r^*(x) = \sup_{G \in M} r^*(x, G)$, $r(x) = \sup_{G \in M} r(x, G)$. (Here $r^*(x)$ and $r(x)$ can be regarded as distances from x to M .) A function $f(x)$ defined for x in some $G \in M$ is termed continuous at M and we write $f(M) = l$, if given $\epsilon > 0$ there exists $G \in M$ such that $|f(x) - l| < \epsilon$ for all $x \in G$. The plane $y = \sum a_i x_i + b$, where x_i is the i th component of x , touches $y = f(x)$ at M , if $f(x) = \sum a_i x_i + b + o(r(x))$, where $o(M) = 0$. With these definitions the author's main theorem states that if M is nicely approachable, if further $f_i(M) = a_i$, $i = 1, \dots, n$, where $f_i(x)$ is the partial derivative of $f(x)$ in x_i , and if $\varphi(M) = b$, where $\varphi = f - \sum a_i x_i$, then the plane $y = \sum a_i x_i + b$ touches $y = f(x)$ at M . Conversely, if M is not nicely approachable, this is false for some f , at any rate when M has a countable basis.

L. C. Young.

Source: Mathematical Reviews,

Vol. 12, No. 3.

SPW

MYSHKIS, A. D.

"Solutions of Linear Homogeneous First-Order Differential Equations
of Unstable Type with Delayed Argument," Dokl. AN SSSR, 70, No.6, 1950

MYSHKIS, A. D.

3000

Myshkis, A. Investigation of a class of differential equations with retarded arguments by means of a generalized Fibonacci series. Doklady Akad. Nauk SSSR (N.S.) 71, 13-16 (1950). (Russian)

The author studies the equation $y'(x) + M(x)y(x - \Delta(x)) = 0$ [$M(x) \geq 0$, $\Delta(x) \geq 0$; $A \leq x < B$]. Use is made of the definitions and notation in an earlier paper [same Doklady (N.S.) 70, 953-956 (1950); these Rev. 11, 522]. It is assumed that $M_0 < \infty$, $\Delta_0 < \infty$, $0 < M_0 \Delta_0 < 1$. Existence and uniqueness of a solution $y(x)$, subject to assigned initial conditions $\varphi(x)$, have been proved by the author previously [Uspehi Matem. Nauk (N.S.) 4, no. 5(33), 99-141 (1949); these Rev. 11, 365]. If there are no zeros of $y(x)$ for $x \geq A$, let $b = B$; in the contrary case let b be the least zero of $y(x)$ for $x \geq A$. Suppose $\varphi(A) > 0$, $A + (n-1)\Delta_0 < B$ for some integer n , and

$$\varphi(A) \sinh [(n+1) \cosh^{-1} (2p)^{-1}] - \varphi_0 p \sinh [n \cosh^{-1} (2p)^{-1}] > 0,$$

where $p^2 = M_0 \Delta_0$. Let $A_k = A + k\Delta_0$ ($k = 0, \dots, n-1$), $A_n = \min [A + n\Delta_0, B]$, $y(x) \leq \varphi(A)$ for $A \leq x < b$; then $y(x) \leq 2p^{x-A} (1-4p^2)^{-1} [\varphi(A) \sinh [(k+1) \cosh^{-1} (2p)^{-1}] - \varphi_0 p \sinh [k \cosh^{-1} (2p)^{-1}]]$

for $A_{k-1} \leq x < A_k$ and $k = 1, \dots, n$. Write

$$\omega = 2[1 + (1-4p^2)^{-1}]^{-1}, \quad \Omega = 2[1 - (1-4p^2)^{-1}]^{-1}.$$

If $\varphi(A) > 0$, $B < \infty$, $y(x) \leq \varphi(A)$, $A \leq x < b$, and $\varphi(A) > p^2 \omega \varphi_0$, then $y(x) > 0$, $A \leq x < B$, and $\lim_{x \rightarrow B} y(x) > 0$. If $\varphi(A) > 0$, $B = \infty$, $y(x) \leq \varphi(A)$, $A \leq x < b$, and $\varphi(A) > p^2 \omega \varphi_0$, then $y(x) > C \exp(-\nu x)$ [$\nu = \Delta_0^{-1} \ln \omega$, some $C > 0$; $A \leq x < \infty$]. If $B = \infty$, $y(x)$ is said to be d.s. (diminishing slowly) if $|y(x)| > C \exp(-\nu x)$ for some $C > 0$ and x sufficiently large, and is said to be d.r. (diminishing rapidly), if $|y(x)| < C \exp(-\nu' x)$ ($\nu' = \Delta_0^{-1} \ln \Omega$) for some $C > 0$ and for all x . If $B = \infty$, then $y(x)$ is d.s. or is d.r. Let $\varphi(x) \geq 0$, $b < B$ and $y(x) \neq 0$ for $x > b$; if $B < \infty$, then $\lim_{x \rightarrow B} y(x) < 0$; if $B = \infty$, then $y(x)$ is d.s.

W. J. Trjitzinsky.

Source: Mathematical Reviews,

Vol. 11 No. 1

Sum
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MYSHKIS, A. D.

PHASE I

TREASURE ISLAND BIBLIOGRAPHICAL REPORT

AID 713 - I

BOOK

Author: MYSHKIS, A. D.

Call No.: AF423519

Full Title: LINEAR DIFFERENTIAL EQUATIONS WITH DELAYED ARGUMENT

Transliterated Title: Lineynnye differentsial'nyye uravneniya s
zapazdyvayushchim argumentom

PUBLISHING DATA

Originating Agency: Series "Sovremennyye Problemy Matematiki"

Publishing House: State Publishing House of Technical and
Theoretical Literature

Date: 1951

No. pp.: 254

No. of copies: 4,000

Editorial Staff: None

PURPOSE: This book is intended for scientists and advanced students who
work in the field of mathematics, physics or mechanics.

TEXT DATA

Coverage: In this book is considered only the case of "distributive"
delaying. However, this work is the first step to the systematical
consideration of the qualitative theory of differential equations
with delayed argument. The book is divided into five Chapters and
four appendixes: Chapter I, General Properties of Linear Differen-
tial Equations with Delayed Argument; Chapter II, General Properties
of the Solutions of Linear Differential Equations of the First Order;

Lineynnye differentsial'nyye uravneniya
s zapazdyvayushchim argumentom

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Chapter III, Linear Homogeneous Equations of the First Order of the "Unstable" Type; Chapter IV, Linear Homogeneous Equations of the First Order; Chapter V, Linear Homogeneous Equations of the Second Order of the Periodical Type; Appendix I, Functions with a Finite Variation and Stieltjes' Integral; Appendix II, Some Inequalities in the Theory of the Stieltjes' Integral; Appendix III, Reverse Sequences; Appendix IV, Generalized Linear Differential Equations with Constant Coefficients and Constant Lag.

No. of References: Total 28, Russian 23 (1913-1951)

Facilities: Names of many Russian scientists are mentioned

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USSR/Mathematics - Schools

Jul/Aug 51

"Student Competition in the Mathematical Physical Faculty of the Latvian State University," A. D. Myshkis

"Uspekh Matemat Nauk" Vol VI, No 4 (44), pp 229-231

One of the essential deficiencies of certain mathematics students, even the comparatively more successful ones, is weakness in the fundamentals of analysis, which weakness arises particularly from their poor ability to reason logically. Taking this into consideration, the Student Sci Society conducted

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USSR/Mathematics - Schools (Contd)

Jul/Aug 51

a contest which had as its purpose the correction of this defect. Gives examples of existence and uniqueness problems (delta-epsilon problems).

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USSR/Mathematics - Societies,
Mathematical

Sep/Oct 51

"The School Mathematical Circle in Riga," A. D.
Myshkis

"Uspekh Matemat Nauk" Vol VI, No 5 (45), pp 204,
205

At the Riga Court of Pioneers a school math circle
of 8th-grade students and above, to be guided by
the teachers and students of the Math Phys Faculty,
Latvian State U. Discusses simple problems given;
lists titles of lectures.

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USSR/Mathematics - Equations of
Telegraphy

Jul/Aug 51

"Law of Conservation of Energy in the Theory of
Generalized Systems of Telegraph Equations," N.
A. Brazma, A. D. Myshkis, Latvian State, Riga

"Prikl. Matem. i Mekh." Vol XV, No 4, pp 495-500

A. D. Myshkis derives from eq of conservation of
energy the uniqueness of soln of mixed problem
and extinction of solns obtained by sepn of vari-
ables. Phys meaning of results and exptl tests were
performed by N. A. Brazma. Submitted 3 Jan 51.

187145

Myškins, A. D. On solutions of linear homogeneous differential equations of the second order of periodic type with a retarded argument. Mat. Sbornik, N.S. 28(70), 15-54 (1951). (Russian)

The author considers the equation

$$(1) \quad y''(x) + M(x)y(x - \Delta(x)) = 0 \quad (M(x) \geq 0, \Delta(x) \geq 0).$$

The general properties of its solutions have been studied by the author [Uspehi Matem. Nauk (N.S.) 4, no. 5(33), 99-141 (1949); these Rev. 11, 365]. $M(x)$, $\Delta(x)$ are given for $A \leq x < B$ ($-\infty < A < B \leq \infty$). The initial conditions are in terms of a number C and a function $\varphi(x)$, defined for $-\infty < x \leq A$. A solution $y(x)$ is supposed to be twice derivable for $A \leq x < B$ ($A < B_1 \leq B$); for $x - \Delta(x) < A$ one considers that $y(x - \Delta(x)) = \varphi(x - \Delta(x))$; $y(A) = \varphi(A)$, $y'(A) = C$. Define $\gamma(x)$ for $-\infty < x < \infty$ as the upper bound of the numbers t , for which $t - \Delta(t) < x$; w_1 here are no such t for $x \leq A$, let $\gamma(x) = A$. Let $\Delta_0 = \sup_{A \leq x < B} \Delta(x)$, $M_0 = \sup_{A \leq x < B} M(x)$, $m_0 = \inf_{A \leq x < B} M(x)$. The segment $[a_1, a_2]$ ($a_1 < a_2$) is the s.c. (semicycle) for $f(x)$ if $f(a_1) = f(a_2) = 0$ and $f(x) \neq 0$ on the interval (a_1, a_2) . If $f(x) > 0$ (< 0), the s.c. is "positive" ("negative"). With $a_1 \leq A$, the s.c. is "great", if $a_2 > \gamma(a_1)$, "small" in the contrary case. Some of the typical results are as follows. Let (2) $\Delta_0 < M_0^{-1}(\frac{1}{2}x + \sqrt{2}) = w_0$; let a_1, a_2 be given with $\gamma(a_1) \leq a_2 < B_1$; a solution $y(x) \geq 0$ (≤ 0) on $[a_1, a_2]$ is given such that $y(a_1) = 0$, $y'(a_1) \leq 0$ (≥ 0); then either $y(x) = 0$ for $x > a_2$ or, for some a_3 on $[a_1, B]$, one has $y(x) = 0$ for $a_1 \leq x \leq a_3$, and either $y(x) < 0$ (> 0) for $x > a_3$, or a_3 is the left end-point of a "great" s.c. $[a_3', a_4]$ of the solution $y(x)$, while (3) $a_2 - a_1 \leq w_0$ and $y(x) < 0$ (> 0) on (a_2', a_3) . If (2) holds, $m_0 > 0$ and $[a_1, a_2]$ is a great s.c. for $y(x)$, then: (A) if $B_1 = \infty$, the semiaxis $[a_1, \infty)$ consists of an infinity of s.c.'s $[a_2, a_3], [a_3, a_4], \dots$, on which the sign of $y(x)$ alternates, while (4) $a_{i+1} - a_i \leq w_0$; (B) if $B_1 < \infty$, then $[a_2, B_1]$ consists of a finite number of great s.c.'s $[a_2, a_3], \dots, [a_n, a_{n+1}]$ and the semi-segment $[a_{n+1}, B_1]$, on which the sign of $y(x)$ alternates, while (4) holds. A detailed and definitive study is given of the form of the solution on its great s.c.'s. Further, there is a comprehensive study of the possibility of small s.c.'s. Finally, in the case when in (1) the possibility of damping is studied.

Source: Mathematical Reviews,

Vol. 13 No. 1

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MYSHKIS, A. D.

theorem. Suppose that in addition to (1) one has the equation:

$$(2) \quad y'(x) + M(x)y(x - \Delta(x)) = 0 \quad [A < x < B, -\infty < A < B \leq \infty]$$

Myshkis, A. D. On solutions of linear homogeneous differential equations of the first order of stable type with a retarded argument. Mat. Sbornik N.S. 28(70), 641-658 (1951). (Russian)
The author studies the equation

$$(1) \quad y'(x) + M(x)y(x - \Delta(x)) = 0 \quad [M(x) \geq 0, \Delta(x) \geq 0, A \leq x < B, -\infty < A < B \leq \infty].$$

A set E_0 is defined as the set of values $x - \Delta(x)$ not exceeding A , with the point A adjoined. On E_0 there is assigned an initial function $\varphi(x)$; $y(x)$ is to satisfy (1), while one sets $y(x - \Delta(x)) = \varphi(x - \Delta(x))$ whenever $x - \Delta(x) < A$; $y(A) = \varphi(A)$; $M(x)$, $\Delta(x)$, $\varphi(x)$ are continuous. It is known [Myshkis, Uspehi Matem. Nauk (N.S.) 4, no. 5(33), 99-141 (1949); these Rev. 11, 365] that there is a unique solution on $[A, B]$. Among the many results is the following comparison

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Source: Mathematical Reviews.

with an initial condition $\varphi(x)$ and solution $y(x)$ (the conditions on the functions in (2) being of the same kind as in (1)); let $y'(x) < 0$ on $[A, C]$ ($A < C < B$), where $y(x)$ is the solution of (1), while $\tilde{y}(A) = y(A)$, $\tilde{y}(x) \leq y(x)$ ($A \leq x \leq C$, $A < C < B$), $\tilde{y}(C) = y(C)$ and $\tilde{\Delta}(x) \leq \Delta(x)$, $\tilde{M}(x) \leq M(x)$ (for $A \leq x \leq C$, $A < C < B$), $\tilde{\varphi}(x) \leq \varphi(x)$ (x in E_0 , x in E_0 , $x \leq x$); let x be defined on the set W of those x in $[A, C]$ for which $\tilde{y}(x) \leq y(x)$, so that $A \leq x(x) \leq C$, $y(x(x)) = \tilde{y}(x)$; under the above conditions one concludes as follows: (a) If $y(x) < y(C)$ for x in $[A, C]$, then $x'(x)$ exists and $x'(x) \leq 1$; (b) $C \leq C$; (c) $\tilde{y}'(x) \geq y'(x(x))$ in W ; (d) $y(x) \leq \tilde{y}(x)$ ($A \leq x \leq C$). The author also studies the behavior of solutions on an interval on which the sign is preserved, occurrence of oscillations when "retardations" are large, the behavior of solutions on an interval of their oscillation, damping of the solutions when the retardations are small.

W. J. Trjuszinsky.

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MYSHKIS, A-D

Myshkis, A. D. I. On the concept of boundary. II. The definition of a boundary by means of continuous mappings. III. On the equivalence of certain methods of definition of a boundary. Amer. Math. Soc. Translation no. 51, 52 pp. (1951).

Translated from (I) Mat. Sbornik N.S. 25(67), 387-414 (1949); (II) ibid. 26(68), 225-227 (1950); (III) ibid. 26(68), 228-236 (1950); these Rev. 11, 382, 609.

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Source: Mathematical Reviews,

Vol 13 No. 3

MYSHKIS, A.D.

Myshkis, A. D., and Abolin, V. E. On uniqueness of solution of a mixed problem for systems of partial differential equations. Doklady Akad. Nauk SSSR (N.S.) 80, 533-536 (1951). (Russian)

The authors prove uniqueness theorems for the generalised telegraphic system

$$\begin{aligned} A_1 \partial u / \partial t + \sum_{i=1}^n B_{1i} \partial u / \partial x_i + \sum_{i=1}^n C_{1i} \partial u / \partial x_i + D_1 u &= h_1, \\ A_2 \partial u / \partial t + \sum_{i=1}^n B_{2i} \partial u / \partial x_i + \sum_{i=1}^n C_{2i} \partial u / \partial x_i + D_2 u + E_2 u &= h_2, \end{aligned} \quad (1)$$

where the unknowns u are n -th order column matrices, as also h_1, h_2 , and $A_1, \dots, A_2$ are n -th order square matrices, all being functions of x and t , where $x = (x_1, \dots, x_n) \in G$, a certain bounded n -dimensional region with boundary Γ , and $0 \leq t < T$ ($0 < T \leq \infty$). Furthermore, the matrices A and B are to be symmetric and there are continuity restrictions. Putting $i = e^{ij}$ and $u = e^{i\alpha} v$ for any constant α and assuming further that C_{ik} is the transpose of C_{ki} , they find for the homogeneous case ($h_1 = h_2 = 0$) an integral identity (too long to reproduce) bearing some resemblance to an energy equation. They deduce a theorem, that if further $B_{1k} |r = 0$, and $A_1 \geq 0, A_2 \geq 0$, then (1) has at most one solution satisfying the boundary conditions: $u|_{\Gamma} = f(x), u|_{t=0} = \phi(x)$ ($x \in G$), $u|_{x_1=0} = \psi(x, t)$ ($0 \leq t < T$), provided that for some α a certain quadratic form involving α is negative definite. This theorem is amplified by seven remarks. The first relates to the analogous case in which $B_{1k} |r = 0$ instead of $B_{1k} |r = 0$. The second says that if $A_1 > 0, A_2 > 0$, then the condition of negative definiteness is satisfied for large α . The third gives more complicated conditions with the same effect; this includes a previous uniqueness theorem of N. A. Brahma and A. D. Myshkis [Akad. Nauk SSSR. Prikl. Mat. Meh. 15, 495-500 (1951); these Rev. 13, 351]. The fourth generalises the boundary condition $u|_{r=0} = \psi$. The fifth suggests relaxation of the continuity restrictions; cf. here A. D. Myshkis [Mat. Sbornik N.S. 26(68), 341-344 (1950); these Rev. 12, 609]. The sixth compares cases, e.g. analytic equations, in which $A_1 \geq 0, A_2 \geq 0$ can be relaxed to $|A_1| \neq 0, |A_2| \neq 0$. Finally they illustrate their theorem by constructing an example in which the uniqueness fails. F. V. Atkinson (Ibadan).

Source: Mathematical Reviews,

Vol. 13

No. 56

MYSHKIS, A. D., Dr.; BOGATYREV, O. M.

Differential Equations

Remarks on O. M. Bogatyrev's article "Determining integration constants in solving a high degree differential equation." Elektrichestvo, No. 6, 1952

Monthly List of Russian Accessions, Library of Congress, November 1952 UNCLASSIFIED

MYSHKIS, A-D

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Myshkis, A. D. A theorem on the convergence of sequences of functions. Uspehi Matem. Nauk (N.S.) 7, no. 1(47), 186-190 (1952). (Russian)

Generalizing a known result concerning harmonic functions, the author shows that if $u_1, u_2, \dots$ is a sequence of twice continuously differentiable functions of $n \geq 2$ variables in a domain G , for which $\sup_i \int_G |\Delta u_i|^2 dG = M < \infty$, where Δ is the Laplace operator and α is a constant $> n/2$, and if the sequence converges in the mean of order 1, then the sequence converges uniformly on any compact subset $F \subset G$.

E. F. Beckenbach (Los Angeles, Calif.).

Source: Mathematical Reviews,

Vol. 13 No. 10

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E.F.B.

MYSHKIS, A. D.

USSR/Mathematics - Lagging Argument, Jul/Aug 52
Hystero-Differential Equations

"Doctoral Dissertation: Differential Equations With
Lagging Argument," A. D. Myshkis

"Uspekhi Matemat Nauk" Vol VII, No 4 (50), pp 190-196

Author's summary of his dissertation in competition for
the learned degree of doctor of physicomath sciences,
which was defended 29 Jun 50 at a session of the Sci
Council of the Mech-Math Faculty of Moscow State U
imeni Lomonosov. Official opponents were: Acad I. G.
Petrovskiy; A. N. Tikhonov, Corr-Mem, Acad Sci USSR;
and Prof V. V. Nemytskiy. Example of subject eqs:
 $y'(x) = y(x+a).$

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MYSHKIS, A. D.

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Differential Equations, Linear

Continuous dependence of the solution of a
compound problem for systems of linear
differential equations on initial conditions
and right-hand members of the system. Mat.
sbor. 30 no. 2, 1952.

Monthly List of Russian Accessions, Library of Congress, August 1952. UNCLASSIFIED.

USSR/Mathematics - Boundary -
Value Problem

Jul/Aug 52

"Transition From the Ordinary First Boundary-Value
Problem to the Modified Problem," A.D. Myshkis, *Riga*

"Matemat Sbor" Vol XXXI (73), No 1, pp 128-135

The modified (according to the terminology of N.I.
Muskhelishvili) Dirichlet problem ("free" Dirichlet
problem) for self-adjoint linear elliptical eqs in
finite-connected regions was studied in 1951 by Yu.A.
Klov in his thesis completed under the direction

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of the author, in which Klov showed that subject
transition is executed in a perfectly std manner. The
purpose of current article is to show in general form
a procedure for this transition. Submitted 1 Mar 52.

MYSHKIS, A. D.

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USSR/Mathematics - Boundary-Value Sep/Oct 52
Problems, Telegraph Equations

"Simplest Boundary-Value Problem for General-
ized Systems of Telegraphic Equations," A. D.
Myshkis, Riga Latvian State U

"Matemat Sbor" Vol 31, (73), No 2, pp 335-352

Generalizes the familiar Bernoulli-Fourier method
of sepn of variables in the soln of simple
boundary-value problems. States that the important
unsolved problem is to obtain analogous theorems
for the boundary conditions of a more general

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form for eqs with variable coeffs, and also for
eqs in which the desired unknown functions depend
upon more than 2 arguments. Submitted 13 Mar 52.

MYSHKIS, A. D.

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USSR/Mathematics - Modern Algebra. Infinitesimal Spaces 11 Jun 52

"The Connection Between Infinitesimal Spaces and Extensions of Topological Spaces," A. D. Myshkis, Latvian State U

"Dok Ak Nauk SSSR" Vol LXXXIV, No 5, pp 879-882

Acknowledges the helpful discussions of E. I. Vigant. Considers the new class of spaces introduced in 1936 by V. A. Yefremovich and called by him infinitesimal. Shows that the theory of these spaces is closely connected with the theory of extensions of topological spaces. In one important partial case, the author

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demonstrates the complete duality of these theories which is believed to hold true in considerably more general cases. Submitted by Acad A. N. Kolmogorov 16 Apr 52.

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MYSHKIS, A. D.

124-1957-1-92

Translation from: Referativnyy zhurnal, Mekhanika, 1957, Nr 1, p 9 (USSR)

AUTHOR: Myshkis, A. D.

TITLE: On the Accuracy of Approximate Analytical Methods for Small Non-linear Free Oscillations With One Degree of Freedom (O tochnosti priblizhennykh metodov analiza malykh nelineynykh svobodnykh kolebaniy s odnoy stepen'yu svobody)

PERIODICAL: V sb.: Vopr. dinamiki i dinam prochnosti. Nr 1. Riga, Izd-vo AN LatvSSR, 1953 ~~pp~~ 139-164

ABSTRACT: A comparison is made between the exact and the approximate solutions of the equation

$$\ddot{x} + f(x) = 0 \quad (1)$$

where $f(x)$ is a given function.

The Author seeks the smallest positive value of $t = \tau$ for which the solution of the equation, as determined by the conditions

$$x(0) = A, \quad \dot{x}(0) = (0) \quad (0 < A < A_0) \quad (2)$$

will be equal to zero. It is assumed that, for $0 < x < A_0$, $f(x)$ is represented by the following power series:

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MYSKIS, A. D.

Mathematical Reviews
May 1964
Analysis

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MYSKIS, A. D. On an extremal property of the solution of the first boundary problem in potential theory. Izvestiya Akad. Nauk SSSR. Ser. Mat. 17, 13-30 (1953). (Russian)

Further properties are developed for the so-called "load function" introduced by the author [in Vestnik Moskov Univ. Ser. Fiz.-Mat. Estest. Nauk 1946, 131-136 (unavailable for review)]. This is defined in the following way. Let G be a region of n -dimensional space and Γ its boundary (for simplicity we discuss only the case of $n=2$). Given a C^1 real-valued function u on G and a simple piecewise smooth closed path S in G , we set

$$\Pi(u, S) = \int_S \frac{\partial u}{\partial n} dS \quad (n = \text{inward normal}).$$

The load function H then appears as

$$(*) \quad H(u) = \sup \sum_{k=1}^n |\Pi(u, S_k)|,$$

where the sup is taken over all finite collections of paths $S_1, S_2, \dots, S_n$ whose interior regions are pairwise disjoint (the "interior" is here determined by the orientation of S rather than by boundedness considerations).

(over)